STAT 453/553: Introductory Biostatistics Syllabus
Spring 2015

Overview

This course provides an overview of statistical methodology useful in the practice of modern biostatistics. There are two major topics covered in the course at an introductory level: biostatistics for epidemiology and clinical trial design. More specific topics are listed in the attached daily syllabus. Previous versions of this course included some bioinformatics. However, because the field of bioinformatics has expanded dramatically recent years and several courses (for example, STAT670, 673, 678, 675) have been specifically dedicated to that topic, we here will not cover bioinformatics. To take advantage of the uniqueness of Texas Medical Center and the importance of the clinical trial in modern biostatistics and medical research, it is important that students have some exposure to the basics of clinical trial design.

Time: Tuesday and Thursday 4:15pm – 5:30 pm

Location: Room 285, BioScience Research Collaborative (BRC), Rice University
6500 Main Street, Houston, TX 77030-1402

Instructors: There are two instructors for the course. Each instructor will cover about 7 weeks of the course. Dr. Suyu Liu will cover biostatistics for epidemiology, and Dr. Ying Yuan will cover clinical trials.

Instructor:	Ying Yuan	Suyu Liu
Email:	yyuan@mdanderson.org	syliu@mdanderson.org
Voice:	713-563-4271	713-563-4280
Location:	FCT4.6034 @ MDA Pickens Towers	FCT4.6032@ MDA Pickens Towers
OfcHrs:	By Appt	By Appt

Teaching Assistant: Liangcai Zhang (Liangcai.Zhang@rice.edu), Dept of Statistics, Rice University

Textbooks: **Statistics for Epidemiology**, by Nicholas Jewell. Publisher: Chapman & Hall/CRC

Homework: Each of the two major parts will include 2-3 assignments, at least one of which will be data based. All students are required to complete the assignments. Homework will be submitted at the beginning of class on the due date. If circumstances beyond the student's control arise and an assignment cannot be submitted on the due date, an instructor should be contacted prior to the due date. With an instructor's permission, late homework may be accepted within one week of the due date. All decisions will be made on an individual student basis and the final decision rests with the instructor assigning the homework. A penalty of 10 percentage points will be applied to late homework.

Website: http://odin.mdacc.tmc.edu/~yyuan/ has more information about the Biostatistics part of the course and datasets for the homework.

Examinations: There will be one in-class exam/final project for each of the two parts in the course.

Course Grade and STAT 453 vs 553

The material covered in the classroom serves two different course, STAT 453 (undergraduate) and 553 (graduate). Although the lectures will cover the same material for both courses, those enrolled in STAT 553 will be required to answer either additional questions or more challenging questions on the both the homework assignments and in-class exam. Although the requirements for the two courses are the same, different grading scales will be applied to the two courses according to their relative level. Both courses will be graded on the following component basis.

Component	%
Homework	40
Exam and final project	60

Disability Statement

Any student with a disability requiring accommodations in this course is encouraged to contact me after class or during office hours. Additionally, students will also need to contact Disability Support Services in the Ley Student Center.

TENTATIVE DAILY SYLLABUS

Week	Date	Topic	Readings*	Notes	Instructor
1	1-13-T	Introduction		Overview the course	Yuan
	1-15-Th	Study Design	SE: 3, 5	Cohort, case-control and observational studies	Liu
2	1-20-T	Disease-Exposure Association	SE: 4	Risk, odds, odds ratio, relative risk, standard errors	Liu
	1-22-Th	Contingency Tables: Association	SE: 6	Chi-square test	Liu
3	1-27-T	Contingency Tables: Confounding	SE: 9	Mantel-Haenszel	Liu
	1-29-Th	Contingency Tables: Interaction	SE: 10	Test of homogeneity	Liu
4	2-3-T	Logistic Regression: introduction	SE: 12	Including review of maximum likelihood estimation	Liu
	2-5-Th	Logistic Regression: estimation	SE: 13	Interaction	Liu
5	2-10-T	Matched studies	SE: 16		Liu
	2-12-Th	Matched studies	SE: 16		Liu
6	2-17-T	TBD			Liu
	2-19-Th	TBD			Liu
7	2-24-T	**Study days**			Liu
	2-26-Th	**Midterm Exam**		**In class exam: Biostatistics**	Liu
8	3-3-T	**Spring Break**		**No class**	
	3-5-Th	**Spring Break**		**No class**	
9	3-10-T	Introduction to clinical trials and Bayesian statistics			Yuan
	3-12-Th	Introduction to clinical trials and Bayesian statistics			Yuan
10	3-17-T	3+3 design and CRM			Yuan
	3-19-Th	Bayesian model averaging CRM			Yuan
11	3-24-T	Bayesian optimal interval design			Yuan
	3-26-Th	Handle Late-onset toxicity			Yuan
12	3-31-T	Phase II trial design			Yuan
	4-2-Th	**Midterm Recess**		**No class**	
13	4-7-T	Phase I/II trial design			Yuan
	4-9-Th	Phase I/II trial design			Yuan
14	4-14-T	Drug combination trials			Yuan
	4-16-Th	Drug combination trials			Yuan
15	4-21-T	Final project presentation			Yuan
	4-23-Th	Final project presentation			Yuan

*SE: Statistics for Epidemiology textbook; HO: Handout